LI-7 (Part No. UBBL03)

Battery Specification

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1. Document Scope

1.1. This document pertains to the performance, operational, and physical characteristics of the UBBL03 battery pack.

2. Important Nomenclature

2.1. Ambient Conditions: 25°C ±3°C

2.2. C Rate: The rate at which 100% capacity is obtained under ambient conditions in 1 hour of constant current discharge.

2.3. Smart Battery: A battery in which a circuit internal to the battery tracks various information about the battery including state of charge, number of cycles, internal temperature, etc.

3. Battery Capacity (C)

3.1. 10Ahr Lithium-Ion Battery Pack

4. Smart Battery Features

4.1. The battery pack is smart battery version 1.1 compliant (www.sbs-forum.org).

4.2. The battery provides Smart battery connections via the connector and 2 contact pins on the top of the battery.

4.3. The battery has a push button state of charge indicator located on the top of the battery. The display uses 5 green LEDs (1 LED = 20%) to display state of charge information (versus rated capacity).

5. Voltage

5.1. Max Voltage: 16.8

5.2. Nominal Voltage: 15.2

5.3. Min Voltage: 12.0

6. Discharge Current

6.1. Maximum Discharge Current: 3.0 A

6.2. Recommended Discharge Current: 2.0 A or below

6.3. Battery ratings based upon C/5 (1.5A) discharge current under ambient conditions.

6.4. **NOTE**: The continuous use of the battery at or near max discharge capability, especially at elevated temperatures, will cause reset-able internal thermal protection devices to activate.

7. Charge Instructions

7.1. Recommended Charging Parameters: Constant Current at 2.0A until pack voltage is 16.8V, then constant voltage at 16.8V until current drops below C/10 (750ma) or a maximum total charge time of 5 hours is obtained.

7.2. Maximum constant current charge rate: 3 A

7.3. Charge times will vary based on charge current used; lower current result in longer times.

7.4. There are 2 contacts in the top of the battery that allow quick connector free connection to a charger (via pogo style pins or other). The top label specifies polarity.

8. Temperature Storage

8.1. Storage between -20°C and 60°C.

8.2. Store battery between 0°C and 45°C for optimum performance.

8.3. Storage between 45°C and 60°C is possible, with product performance losses.

8.4. A temporary disabling device will operate if internal pack temperature reaches 70±5°C.

8.5. Storage above 91°C or an extended storage at 68°C will cause a permanent disabling device to activate.

9. Operational Temperature

9.1. Operational between -20°C and 60°C.

9.2. Operate battery between 10°C and 45°C for specified performance characteristics.

9.3. Operation outside of the specified window will result in lower product performance dependent on application usage.

9.4. A temporary disabling device will operate if internal pack temperature reaches 70±5°C.

9.5. Operation above 91°C or an extended storage at 68°C will cause a permanent disabling device to activate.

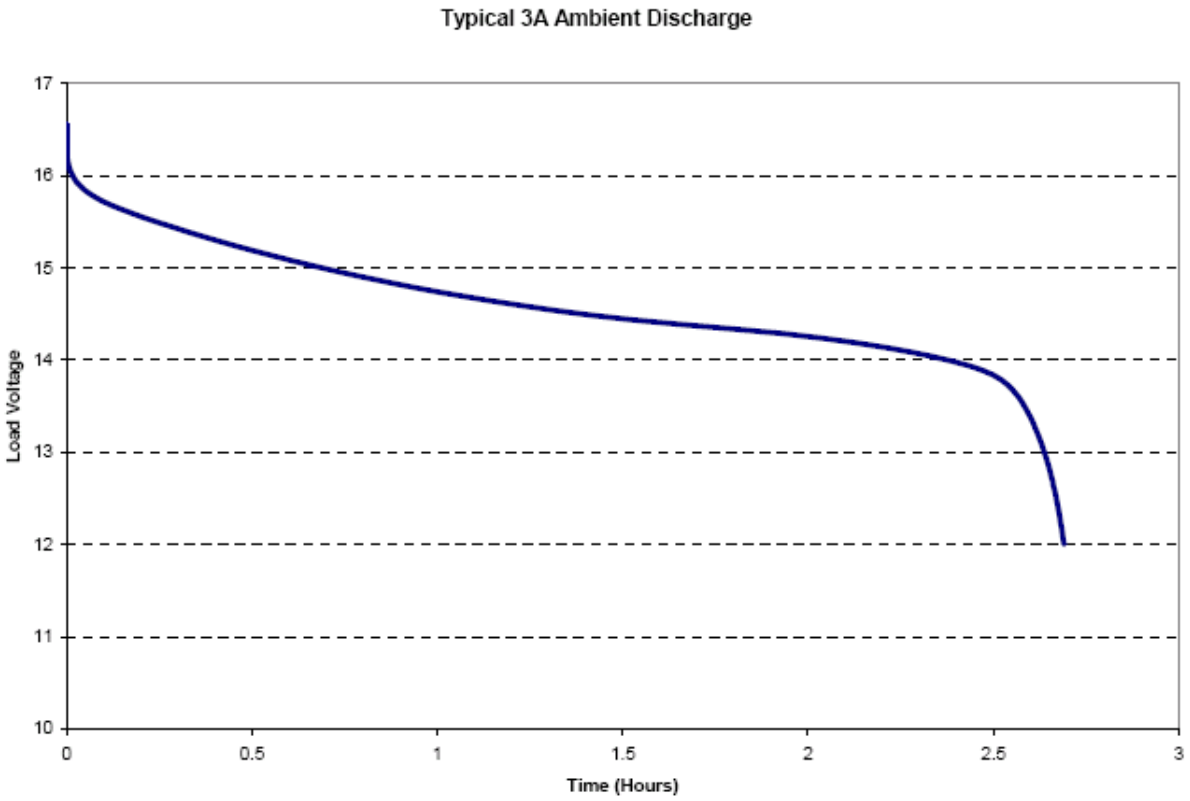
10. Environmental Information

10.1. The battery is rated to IP68 for water protection in immersed environmental applications.

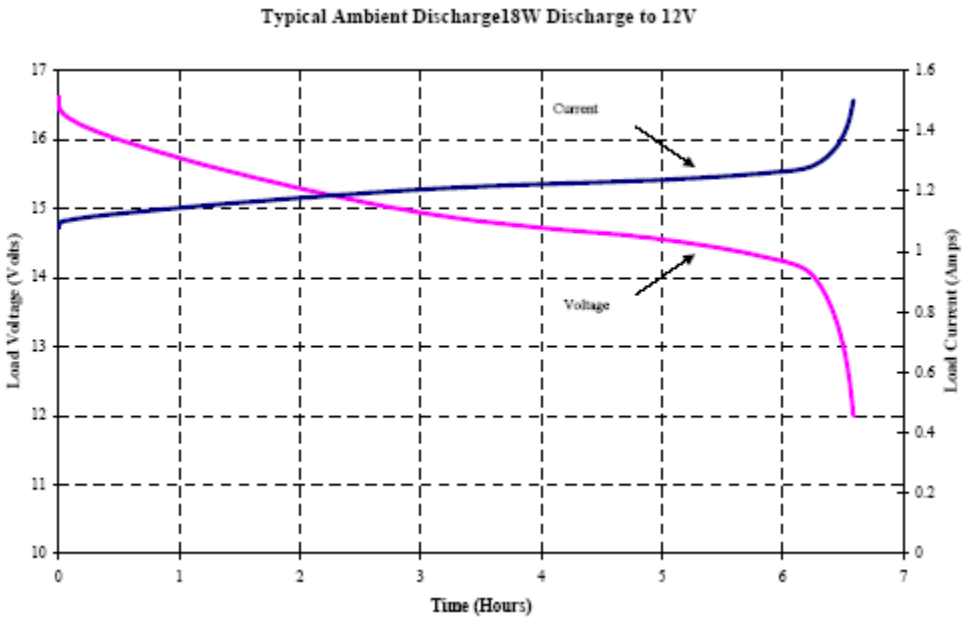
11. Capacity Testing

11.1. Rated capacity is specified as the C/5 discharge rate under ambient discharge conditions, when previously completing charge at ambient conditions within 1 hour of discharge per the specified charge regime.

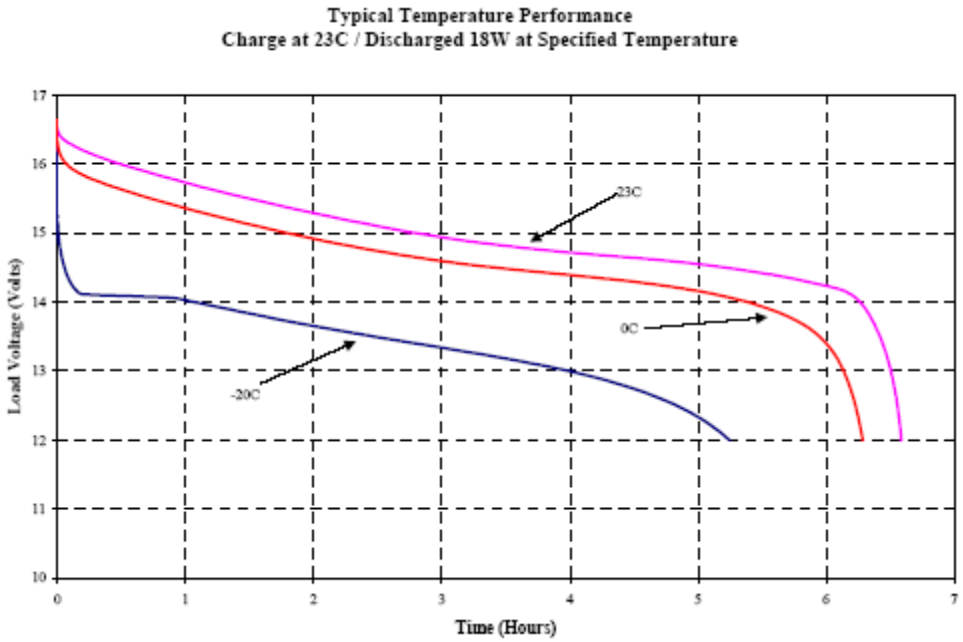
11.2. Typical 3 ampere ambient discharge:



11.3. Typical 18 watt ambient discharge:



11.4. Typical 18 watt temperature discharges at various temperatures:



12. Cycle Life Testing

12.1. The pack will obtain 300 cycles at greater than 80% rated capacity at recommended charge and C/5 discharge rates under ambient conditions.

13. Shelf Life

13.1. Self discharge typically less than 5% per month.

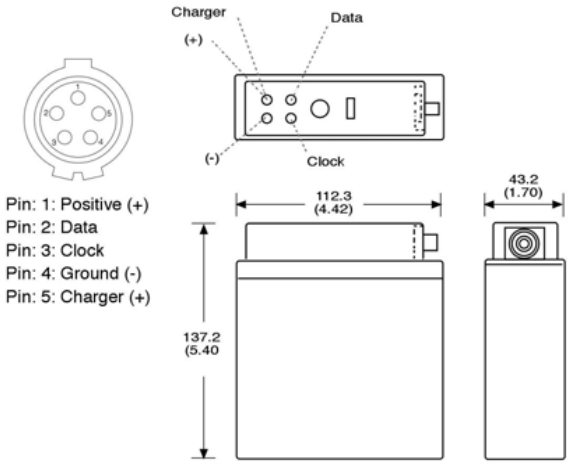
13.2. A battery pack should retain greater then 95% of the initial capacity when stored for 1 year under ambient conditions when tested per the capacity test in section 11.

13.2.1. A battery pack should retain greater then 90% of the initial of the initial capacity when stored for 1 year at temperatures above ambient and below 45°C when tested per the capacity test in section 11.

13.2.2. A battery should retain greater then 85% of the initial of the initial capacity when stored for 6 months at temperatures above 45°C and below 60°C when tested per the capacity test in section 11.

14. Dimensions

14.1 4.42” x 5.4” x 1.70”



15. Weight

15.1 Less than 944 g

16. Case Material

16.1 Noryl N190X-701

17. Case Color

17.1. Black

18. Label requirements

18.1. The label will include Manufacturer, location, country of origin, voltage, capacity, energy, charging instructions and warning/storage.

18.2. Safety information and Warnings:

18.2.1. CHARGE PROFILE: Charge at maximum 16.8V constant voltage with current of 2.0A (Max 3.0A). Battery temperature should be between 32˚F(0˚C) and 113˚F(45˚C). Charge at 16.8v Constant Voltage for 5 Hours (3A Max Current).

18.2.2. WARNING/ STORAGE: Store at 50% capacity. Do not store above 60°C (140°F), Crush, Mutilate, Reverse Polarity, Disassemble, or Dispose of in Fire.

18.3. The label shall be legible and free from visible defects such as wrinkles and cracks.

18.4. The battery pack will be serialized to maintain trace ability.

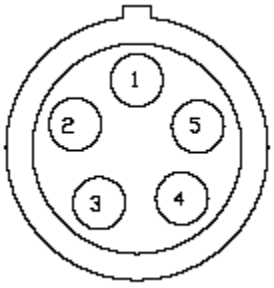
18.5. The connector contacts will be clearly labeled for polarity.

19. Connector

19.1. Battery Connector: Lemo part number HEN.1F.305.XLNP or equivalent (www.lemo.com).

19.2. Mating Plug Connector: Lemo FGN.1F.305.XLC or FGN.1F.305.YLC series or equivalent.

Pin #1: Positive (+)
Pin #2: SB Data
Pin #3: SB Clock
Pin #4: Negative (-)
Pin #5: Charger (+)



20. Battery Protection Circuit

20.1. Prevent max pack voltage from exceeding 17.4V.

20.2. Prevent min pack voltage above 11.0V.

20.3. All cells prevented from exceeding 4.35V.

20.4. All cells prevented from discharge below 2.75V.

20.5. Over current protection setting (OCP) 13.5A (higher surge currents higher allowed for 921µSec).

20.6. Typical Discharge current is 2.0A.

20.7. Prevent external short circuit of the pack.

21. Chargers and Charge Control Chipsets

21.1. Only use Ultralife approved chargers or chipsets that operate within specified charge profile requirements.

21.1.1. Lower charge currents are acceptable, but result in increased charge time requirements.

22. Quality and Workmanship

22.1. The battery case and connector will be free of visible scratches, cracks, and or damage.

23. Shipping and Transportation Requirements

23.1. The battery pack will be shipped in a state of charge greater than 20% and less than 30%.

23.2. UN T1-T8 testing completed and passed.

23.3. Class 9 regulation for shipment.

23.4. IATA Shipping Status: Approved for Cargo Air Transportation: No, Testing is ongoing.

24. Safety Requirements

24.1. Only specified connectors should be used to connect with battery pack.

24.2. Do not store above 60°C (140°F), Crush, Mutilate, Reverse Polarity, Disassemble, or Dispose of in Fire.